his chosen field of work, who was so broadly sympathetic in his views, and who endeared himself to so many by his personal character and attainments.

F. L. O. Wadsworth.

Allegheny Observatory,
May 1, 1901.

THE LARYNX AS AN INSTRUMENT OF MUSIC.

I see in the last number (April) of the *American Journal of Science* an excellent paper by Professor Scripture on the 'Nature of Vowels.' After a graphic analysis of these sounds, he criticizes with much acuteness the views of other writers. Of this I have nothing to say, except that I have been greatly interested. But in the last paragraph he concludes that the so-called vocal cords cannot vibrate in the manner of strings nor of tongues of reed-pipes, but must vibrate *compressively* in the manner of *elastic cushions*.

Now I write this to say that somewhat similar views have been expressed by me in my class lectures on comparative physiology for 25 years, although not published until last year in my book on 'Comparative Physiology and Morphology of Animals.'

On p. 210 of that work, speaking of the *larynx as a musical instrument*, after showing that it cannot be likened to a stringed instrument nor to a reed-pipe, I say: "It is strange that no one has thought to liken it to an ordinary *horn*—a stage horn, or better, a *French-horn*. In this instrument the sound is modulated exactly as in the larynx, viz., by the *tension* and the *pressing together* of the *lips of the performer*. The edges of the *rima glottidis* ought to be called *the vocal lips*—as indeed they are, and not *the vocal cords*—which they are not in any sense. The analogy between the two instruments is perfect. The performer on the horn presses his lips together tighter, makes them tenser and the opening between them smaller, in proportion as he desires a higher note. He then drives the air between the tense lips so as to set their edges in vibration. This vibration, by alternate partial closing and opening of the aperture, gives rise to *successive jets or pulses of the out driven air*, and this in its turn gives corresponding pulses to the air in the sounding cavity of the horn. Precisely the same, as we have seen, takes place in the larynx. The only wonder is that so small an instrument as the larynx and the mouth-cavity should be capable of such marvelous effects."

It is true I do not say anything about '*compressive vibrations*,' but I think there can be no doubt that the nature of the vibrations in the two cases is identical.'

Joseph Le Conte.

Berkeley Cal., April 24, 1901.

THE PHOTOGRAPHY OF FOSSILS.

To the Editor of Science: In the current issue of Science (May 3, 1901), p. 710, report is given of a paper read before the New York Academy of Science by Mr. Gilbert van Ingen, on 'A method of facilitating Photography of Fossils.'

It may be of interest to your readers to know that a patent covering the process there described was issued in December 1899, and a company, the 'Scientific Photograph Company,' under the business management of Roger H. Williams (Address 28 East 28th St., New York) has been formed to execute orders for the preparation of illustrations by this patented process. The results obtained are successful in reproducing the most delicate details of the form of opaque objects of all kinds in which accuracy is demanded. The process eliminates both the interpretation of the artist and the distorting effects of color and uneven reflection of natural surfaces, and is proving of great value as a means of reproducing, in publications, the exact form of fossils and other objects.

Henry S. Williams.

Yale University,
May 7, 1901.

SHORTER ARTICLES.

VARIATION IN LIGHT OF EROS.

The range of variation in the light of Eros, which has been diminishing during the spring, has now become zero. In February, 1901, it was found by European astronomers to amount to 2.0 magn. Observations by Professor O. C. Wendell, with the Harvard Equatorial, showed that the range on March 12, 1901, was 1.13

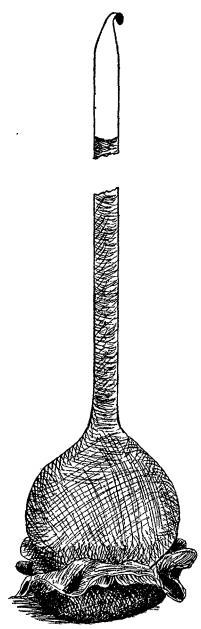
magn.; on April 12 it was 0.40 magn., and on May 6 and 7 it was imperceptible and apparently less than 0.1 magn.

EDWARD C. PICKERING.

HARVARD COLLEGE OBSERVATORY, May 8.

A SIMPLE OSMOMETER.

THE end of a thistle tube is drawn out, broken off and closed temporarily with wax. The bulb is then filled with molasses and a piece of pig's bladder,* is securely but loosely tied over the



mouth. The wax is removed from the end of the stem and the end well fused. Two thicknesses of strong linen are tightly drawn and securely tied over the membrane to take the strain. The bulb is then placed in water, when in a few minutes the column of liquid becomes higher and the air column compressed by the osmotic action through the membrane.

In two or three days the maximum pressure is obtained, then the length of the air column is taken. The air in the stem is allowed to expand to its normal condition by puncturing the membrane with a needle and the length of the air column measured; which length, divided by the length under compression, gives the pressure in atmospheres.

The greatest pressure I have yet obtained with an apparatus of this sort is the expansion of 1.5 cm. to 13.2 cm., showing a pressure of 8.8 atmospheres, or 668.8 cm. of mercury, or 129 pounds per square inch.

The highest pressure I find recorded for Pfeffer's cell is 436.8 cm. mercury.*

The air column after expanding will not be so long by six to eight per cent. as it was before compression, showing that some of the air has been absorbed by the liquid.

The accompanying figure will serve to show how the apparatus is arranged.

E. E. BOGUE.

LABORATORY OF PHYSIOLOGICAL BOTANY, HARVARD UNIVERSITY, April 16, 1901.

* These bladders may be obtained of Kny-Scheerer Co., 19th street and 4th Avenue, New York City. They are clean and dry like parchment, and cost ten cents each or one dollar per dozen.

* Goodale's 'Physiological Botany,' Vol. II., p. 229.

CURRENT NOTES ON PHYSIOGRAPHY.

PHYSICAL GEOGRAPHY OF THE TEXAS REGION.

THE third folio of the Topographic Atlas of the United States is entitled 'Physical Geography of the Texas Region' by Hill. It may well serve as a type of many to follow. Twelve folio pages are given to text, chiefly concerned with an explanation of relief and drainage; then follow a sheet of nine climatic and other diagrams, four sheets holding 22 photographic views of typical landscapes, five sheets presenting 24 small topographic maps of typical reliefs and streams, and finally a folded map of Texas drawn under Hill's direction by Selden and Johnson on a scale of 25 miles to an inch with contours every 250 feet. The imperial area of the 'Texas region' is indicated by the statement that each of more than twenty physiographic subdivisions has an extent equal to that of an average State. Mountains, plateaus and plains, canyons, valleys and waste-floored basins (bolsones) are described in so great variety that selection for special remark is difficult. Descriptions are marked by a thorough-going adoption of explanatory methods, such as have always found ardent ad-